Department of Ecology
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City of West Richland

Cumulative Impacts Analysis

Yakima River

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Chapter 1: Introduction

A. Department of Ecology Direction and Guidance

The Shoreline Management Act (SMA) guidelines require local shoreline master programs (SMPs) to regulate new development to "achieve no net loss of ecological function." The guidelines (Washington Administrative Code (WAC) 173-26-186(8)(d)) state that:

> "To ensure no net loss of ecological functions and protection of other shoreline functions and/or uses, master programs shall contain policies, programs, and regulations that address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts."

The guidelines discuss the concept of net loss in more detail in WAC 173-26-201(2)(c).

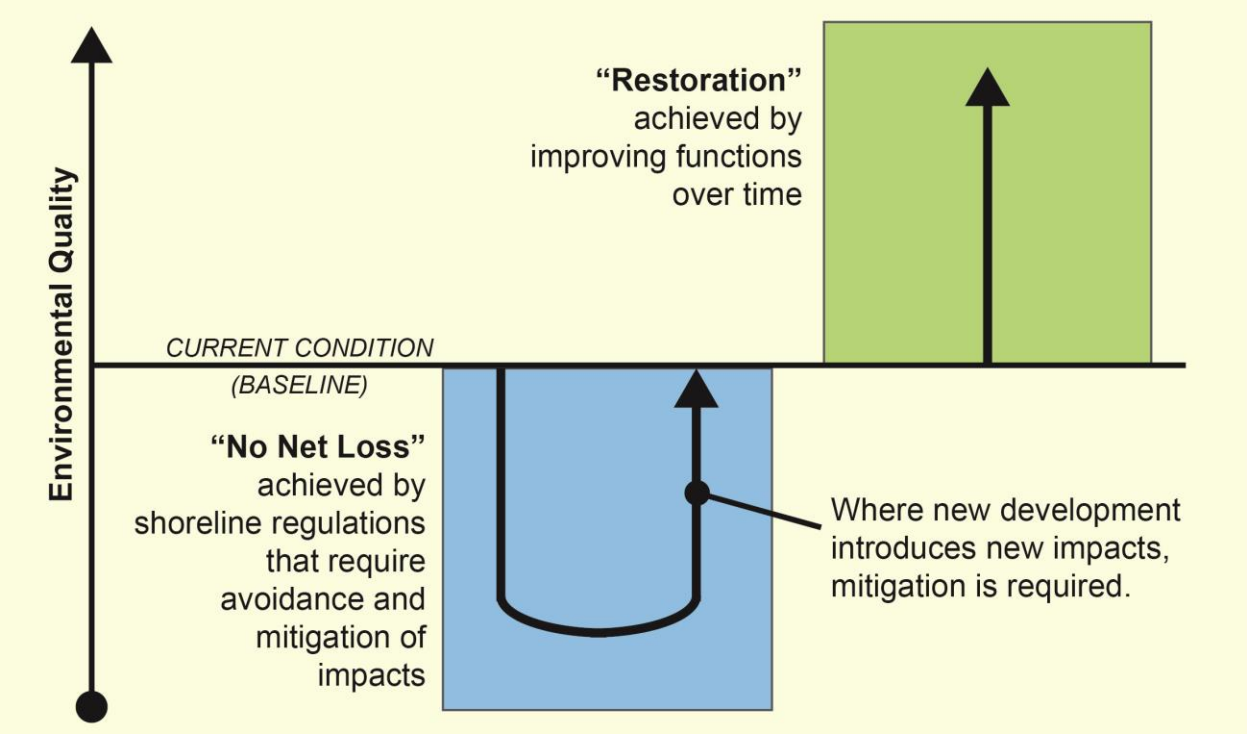

Figure 1 – No Net Loss and Baseline Conditions. Source: Department of Ecology

The City of West Richland's (the City's) updated SMP contains goals, policies, and regulations that prevent degradation of ecological functions relative to the existing conditions as documented in the *City of West Richland Shoreline Inventory and Characterization (SIC).* For those projects

that result in degradation of ecological functions, the required mitigation must return the resultant ecological function back to the baseline, as illustrated in Figure 1 above.

The City must be able to demonstrate that it has accomplished that goal through an analysis of cumulative impacts that might occur through implementation of the updated SMP. Evaluation of such cumulative impacts should consider:

1. Current circumstances affecting the shorelines and relevant natural processes;
2. Reasonably foreseeable future development and use of the shoreline; and
3. Beneficial effects of any established regulatory programs under other local, state, and federal laws.

As outlined in the *Shoreline Restoration Plan,* that will be prepared as part of Phase 4 of the City's SMP update, the SMA also seeks to restore ecological functions in degraded shorelines. This cannot be required by the SMP at a project level, but Section 173-26-201(2)(f) of the Guidelines note that "…master programs shall include goals and policies that provide for restoration of such impaired ecological functions." The *Shoreline Restoration Plan* will have a discussion of SMP policies and other programs and activities in the City that contribute to the long-term restoration of ecological functions relative to the baseline condition.

For those portions of the Yakima River that are within the City, the following analysis summarizes the existing conditions, anticipated development, relevant SMP and other regulatory provisions, and the expected net impact on ecological function.

B. Relationship to SEPA

The State Environmental Protection Act (SEPA) requires an assessment of environmental impacts. This cumulative impact analysis is a supplement to the environmental review done under SEPA and is intended to address cumulative rather than isolated or individual impacts that might not be considered otherwise as part of the environmental checklist.

The SEPA review process is intended to provide a list of possible environmental impacts that may occur because of a project or change in policy. This helps identify potential impacts that may need to be mitigated, conditioned, or this may result in the denial of a project or proposal. This cumulative impact analysis is intended to look at impacts as a whole based on whether or not multiple similar projects collectively result in gradual, but significant impacts. While SEPA looks at impacts by topic and the effects they may have as a whole for the project area, the cumulative impacts analysis (CIA) examines impacts that may result from multiple projects over time.

C. Assumptions

This analysis considered foreseeable impacts over time. Impacts are examined in the shoreline jurisdiction as completed in the existing SMP document and in the SIC. In addition, site-specific impacts are expected to be addressed on a case-by-case basis during individual project reviews. This analysis corresponds with the four proposed upland shoreline environment designations.

Due to current adopted land use regulations and existing land uses, it is assumed that the areas around the Van Giessen Bridge in Reach 2 -Yakima River East in the City have significant redevelopment potential. The areas along the western portion of the Yakima River that are isolated from the rest of the City are likely to see slow changes associated with on-going uses, with no further intensification of uses in the near future. This is discussed in detail later in this document.

D. Document Roadmap

This CIA summarizes the existing conditions in the two shoreline reaches of the Yakima River within the City. It details the potential impacts and risks to shoreline functions and processes, identifies anticipated development in each shoreline and how the SMP regulations would address this development, discusses how other local, state and federal regulations would address these potential impacts, and describes the net effect on ecological functions and processes. Cumulative impacts tables are included in Appendix 1. The tables describes the relationship between ecological function, potential alteration, resources at risk, and proposed SMP regulations and non-regulatory measures designed to assure no net loss at a minimum.

Chapter 2: Existing Conditions

The following summary of existing conditions in the City's two shoreline reaches and the relevant natural processes is based on the final SIC prepared by Herrera Environmental in October 2013 and additional analysis needed to perform this assessment. The full SIC includes a more in-depth of discussion of the topics below.

A. Reach 1 – Yakima River West

Reach 1 is currently undeveloped and consists primarily of upland scrub/shrub rangeland. Zoning in this reach is primarily low density residential. Key processes and functions related to water and sediment transport, water quantity and quality, and habitat, are low to moderate but likely comparable to historical potential in providing such functions. Impaired water quality may be a secondary result of regional agricultural practices.

1. Shoreline Environments

In Reach 1, the western portion of the Yakima River in the City, the entire upland shoreline jurisdiction is proposed to be designated as the Urban Conservancy environment designation.

2. Land Use

Within the upland portion of the Yakima River shoreline jurisdiction in Reach 1, almost all of the land area is undeveloped. A small portion on the downstream section of this reach is developed as an irrigation facility.

The western portion of the Yakima River shoreline jurisdiction in Reach 1 currently has three zoning designations: Low Density Residential 40 (65.3%) and Public Parks and Recreation (33.4%), and Medium Density Residential 10 (1.3%). Future land uses, as indicated by the current designations in the City's Comprehensive Plan, include Low Density Residential and Public Reserve.

The proposed shoreline environment designations reflect both the existing conditions and potential future uses along the Yakima River, which are not likely to change in use or intensity from current conditions. The designation of the shoreline jurisdiction reflects the City's intent to recognize the continuance of the existing agricultural uses

while acknowledging the likelihood that the existing natural character of this area will not be changing in the near future.

3. Parks and Open Space/Public Access

Presently, there is no existing formal public access to the Yakima River in Reach 1.

4. Shoreline Modifications

Modifications to the river itself in Reach 1 are minimal. Within the upland portion of Reach 1, impervious surfaces are associated with the irrigation pumping station in the northern portion of the reach and a road and structure in the southern portion of the reach. The remainder of the reach is unmodified.

5. Biological Resources and Critical Areas

a. Geologically Hazardous Areas

The City has mapped geologically hazardous areas in Reach 1, and portions of the reach contain geologically hazardous areas. Those areas within the shoreline jurisdiction are subject to the City's regulations set forth in the SMP and its associated shoreline jurisdiction Critical Areas Ordinance (CAO) appendix.

b. Flood Hazard Areas

Portions of the Yakima River's floodway are located in Reach 1. Based on the GIS analysis conducted for the City's SIC, there are eleven parcels within Reach 1, with five found within the floodway and ten within the floodplain.

c. Wetlands

According to the Map 8.1, the National Wetland Inventory (NWI) identified one small wetland in Reach 1. Any undocumented wetlands located within or adjacent to the City, and which are associated with the shoreline jurisdiction would also be subject to the City's SMP regulations and its associated shoreline jurisdiction CAO appendix.

d. Streams

The portions of the Yakima River within Reach 1 form the City's western boundary.

e. Other Fish and Wildlife Habitat Conservation Areas

For priority habitats and species, anadromous fish habitat is a wildlife conservation area of concern. According to the Washington State Department of Fish and Wildlife (WDFW), anadromous fish habitat is present in the Yakima River. The Yakima River is a known spawning area for Coho Salmon and Chum Salmon. Additionally, the Yakima River is known rearing habitat for Steelhead, Chinook, and Pink Salmon and Bull Trout. The Endangered Species Act (ESA) lists the Chinook salmon, Steelhead, and Bull Trout as threatened species.

f. Critical Aquifer Recharge Areas

Reach 1 lies outside the City's critical aquifer recharge area.

B. Reach 2 – Yakima River East

Reach 2 is more developed than Reach 1, containing several single-family residential parcels, medium density commercial development around the Van Giesen Bridge, portions of an RV park, and the West Richland Golf Course. The golf course and the open space surrounding the wastewater treatment facility account for the majority of the reach's acreage.

Reach 2 has a relatively high potential to provide functions primarily related to habitat conditions that include meandering pool-riffle channel, likely spawning areas, and stable vegetated bars that support potential food production and interactions. Functions present include the development of complex in-stream habitat structure and groundwater exchange with the floodplain. Functions may be impacted by current land use, agriculture practices, and existing commercial and residential development. This reach may also provide important functions related to water and sediment transport processes.

1. Shoreline Environments

In Reach 2, the eastern portion of the Yakima River within the City, 97.8% of the upland shoreline jurisdiction is proposed to be designated as the Urban Conservancy environment designation, approximately 1.6% is proposed to be designated as the

High Intensity environment designation and approximately 0.6% is proposed to be designated Shoreline Residential environment designation.

2. Land Use

Within the upland portion of the Yakima River shoreline jurisdiction in Reach 2, the majority of land is currently undeveloped and remaining land uses include single-family residential and commercial uses, a golf course, and right-of-way developed as roads.

Reach 2 currently contains seven zoning designations: Agriculture (47.4%), Public Parks and Recreation (44.7%), Public Capital Facilities (5.6%), Low Density Residential 22 (0.8%), Multi-Family Residential (0.6%), Commercial Use (0.5%), and Medium Density Residential (0.4%). Future land uses, as indicated by the current land use designations in the City's Comprehensive Plan, include Low-Density Residential, Medium-Density Residential, Commercial, and Public Reserve.

The proposed shoreline environment designations reflect both the existing conditions and potential future uses along the eastern section of the Yakima River. While redevelopment may occur, uses are not likely to change in intensity from current conditions greatly. The designation of the shoreline jurisdiction reflects the City's intent to continue to encourage existing uses in the future while recognizing the existing nature and environmental constraints of portions of this area.

3. Parks and Open Space/Public Access

Presently, there is no existing formal public access to the Yakima River in Reach 2; however, the City has formal plans to develop water access and a dock near the north side of the Van Giesen Bridge.

4. Shoreline Modifications

Impervious surfaces within Reach 2 include roof tops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, and packed earth (e.g. lawns, athletic fields, etc.), or other surfaces which similarly impede the natural infiltration of surface and storm water runoff. Much of the river channel in this reach has been modified in some manner by diking or other means.

5. Biological Resources and Critical Areas

g. Geologically Hazardous Areas

There are no geologic or erosion hazard areas located within the boundaries of Reach 2.

h. Flood Hazard Areas

A portion of the Yakima River's floodway and associated floodplain is located in the shoreline jurisdiction of Reach 2. Based on GIS analysis conducted for the City's SIC, there are 32 parcels within Reach 2, with 14 found in the floodway and 15 found within the floodplain.

i. Wetlands

According to Map 8.2, NWI identified wetlands in Reach 2. Any undocumented wetlands located within or adjacent to the City, and which are associated with the shoreline jurisdiction would also be subject to the City's SMP regulations and its associated shoreline jurisdiction CAO appendix.

j. Streams

The portions of the Yakima River within Reach 2 form the City's northern and eastern boundary.

k. Other Fish and Wildlife Habitat Conservation Areas

For priority habitats and species, anadromous fish habitat is a wildlife conservation area of concern. According to the Washington State Department of Fish and Wildlife (WDFW), anadromous fish habitat is present in the Yakima River. The Yakima River is a known spawning area for Coho Salmon and Chum Salmon. Additionally, the Yakima River is known rearing habitat for Steelhead, Chinook, and Pink Salmon and Bull Trout. The Endangered Species Act (ESA) lists the Chinook salmon, Steelhead, and Bull Trout as threatened species.

l. Critical Aquifer Recharge Areas

Reach 2 lies outside the City's critical aquifer recharge area.

Chapter 3: Ecological Functions and Processes at Risk

The intent of the City's SMP is to assure, at a minimum, no net loss of ecological functions necessary to sustain shoreline natural resources. The following subsections outline specific ecologic functions of the City's shoreline jurisdiction and related processes that are at risk and must be protected by the SMP.

A. Nutrient Delivery and Removal

Nutrient delivery and removal can result from a variety of processes that take place in the City. This would include runoff and irrigation from agricultural uses, residential landscaping, and land clearing. These processes lead to an excess of nutrients being released into the Yakima River.

B. Groundwater Flow

Development and infrastructure has altered groundwater flow within the City's shoreline areas, resulting in disrupted interactions between the Yakima River ecosystems and the hyporheic zone within the City, but especially the Yakima River upstream in Benton and Yakima Counties. Overbank flooding and hyporheic flows in the floodplain areas are important processes in the Yakima River basin. These surface and subsurface water flow processes support the hydrology of existing wetlands and the Yakima River ecosystem.

Development causes greater areas of pollution generating impervious surfaces by paving, creating non-pollution generating surfaces with building construction, and compacted soil. In addition, development removes vegetation that would intercept and treat runoff. All of these factors lead to greater surface runoff and lower infiltration rates, which result in a lower level of aquifer recharge. Wetlands are useful in slowing surface water runoff and storing surface waters in addition to storm water detention facilities that are required in the development of land.

C. Surface Water Flow

Channelization of rivers and streams and filling of wetlands has intercepted and altered surface water flows, resulting in altered flow and lower infiltration rates. This has resulted in increased storm water runoff and increased peak flow and velocities. Ditching, channelization and clearing

vegetation from floodplains and aquatic resources can affect hyporheic flows if not protected; these flows are needed to support existing and potential wetlands as well as the Yakima River.

D. Sediment Delivery and Removal

Sediment delivery and removal in the City has been affected by land clearing and urban development in the area. Conversion of scrublands to agriculture, road construction, and development has all changed the sediment transport processes in the area around the City. Increased impervious surfaces and altered hydrology from new developments in the area could also potentially alter sediment processes.

E. Fish and Wildlife Habitat

Fish and wildlife habitat is affected by urban developments, road construction; culverts, loss of riparian cover, and stream bank alterations. Important habitat elements for fish include – riparian cover, passage for migration, clean water, spawning habitat, off-channel habitat, forage habitat, and food sources. There are several areas of spawning habitat in the City shoreline areas, and rearing habitat has been identified in the Yakima River within the City. Alteration of these habitats, loss of wetlands and riparian areas reduce the habitat areas for many species including small mammals, amphibians, reptiles, birds, and other aquatic and terrestrial species.

Chapter 4: Foreseeable Development in Shoreline Environments

A wide range of possible actions may result in cumulative impacts to the shoreline environment. Consistent with the SMA guidelines, an evaluation of cumulative impacts on ecological functions considers reasonably foreseeable future development and use of the shoreline that is regulated by the SMP, as well as actions that are caused by unregulated activities and development exempt from permitting.

The focus of foreseeable development is on those actions that have been identified as potential impacts to the shoreline environment and that are or would be foreseeable based on past development patterns, dependent on shoreline regulations. This section provides a description of how elements of the SMP address the potential impacts of reasonability foreseeable development, including exempt and unpermitted development.

A. Reach 1 - Yakima River West

Reach 1 is an unmodified river corridor and the upland portion of the shoreline jurisdiction has not been modified.

Zoning in Reach 1 consists primarily of Low Density Residential (40 acres) or Public Parks and Recreation. A small portion of Reach 1 is zoned Medium Density Residential 10. Almost all of the land within Reach 1 is under common ownership. Low Density Residential zoning would allow very large-lot residential development to occur in currently undeveloped portions of Reach 1 along the Yakima River. Residential development would potentially result in impacts on water quality related to impervious surface, such as building roofs and roads, and stormwater management. Alteration of primarily upland vegetation and conversion of upland habitat could result from residential development but would likely be limited due to the large lot size.

Additionally, the shorelands of Reach 1 are under common ownership with a large agriculture operation to the east. In addition, the minimum lot size required by the Low Density zoning would allow for relatively few residences. Consequently, significant redevelopment of Reach 1 may not occur in the near future. If development does occur, the potential impacts are likely limited by the current zoning, existing topography, and by measures included in the SMP and described in this CIA. There are two shoreline environment designations along the Yakima River: Urban Conservancy and Aquatic. Aquatic is the shoreline environment designation for the portion of the river waterward from the Ordinary High Water Mark (OHWM).

1. Patterns of Shoreline Activity

The City has issued no shoreline permits in Reach 1 over the past 20 years.

2. Residential Development

Under current City zoning, single-family residential uses are permitted in the shoreline jurisdiction. However, given the existing use as productive agricultural land far from any level of urban development, it is not anticipated that the land use within the shoreline jurisdiction will change in the near future.

Under the SMP, in Chapter 5 - Use Specific Regulations, residential development in the Urban Conservancy designation would require a shoreline setback of 100 feet. Refer to Table 3 – Minimum Shoreline Setbacks from the OHWM in the SMP. Shoreline setbacks may be reduced by a maximum of 25% if measures to enhance habitat function are incorporated into the proposed development and approved by the Shoreline Administrator.

3. Commercial, Industrial, and Utility Development

The existing zoning in Reach 1 does not allow commercial or industrial development. Utility development is permitted in the Urban Conservancy shoreline environment. Shoreline setbacks range from 0 feet for water-dependent structures to 100 feet for non-water-oriented utility structures.

4. Recreational Development

In the Public Parks and Recreation zoning district (33.4% of the upland shoreline area), public recreational facilities are permitted. Given the existing operational agricultural land use, it not expected that the existing land use would change from the current condition.

Under the SMP, in Chapter 5: Use Specific Regulations, water-oriented and non-water-oriented recreational development would be permitted outright within the Urban Conservancy environment designation.

5. Overwater Structures

The Yakima River within Reach 1 is not considered navigable. Based on Chapter 5: Use Specific Regulations, boating facilities such as boat launches and docks are allowed as a conditional use in the Urban Conservancy shoreline environment.

6. Shoreline Stabilization

According to aerial photos and site visits, there is no shoreline armoring along the western portion of the Yakima River within the City. In SMP Chapter 4: General Regulations, Table 1 – Shoreline Modifications, in the Urban Conservancy environment designation, clearing and grading are permitted if zoning allows, while dredging, fill, shoreline stabilization, and flood hazard reduction measures are permitted as conditional uses subject to review procedures.

B. Reach 2 - Yakima River East

Reach 2 contains a modified river corridor. Much of this section of the river has been modified in some manner through diking, which has affected some in-stream habitat. As indicated by the NWI, here is the potential for unmapped wetlands.

There are four shoreline environments designations within Reach 2: High Intensity, Shoreline Residential, Urban Conservancy, and Aquatic. Aquatic is the shoreline environment designation for the portion of the river waterward of the OHWM.

1. Patterns of Shoreline Activity

The City has issued one shoreline permit in Reach 2 over the past 20 years.

2. Residential Development

Under current City zoning, 0.8% of upland Reach 2 is Low Density Residential 22, 0.6% is Multi-family Residential 3, and 0.4% is Medium Density Residential. Single-family residential development could occur in all three zoning districts. The minimum lot size in the residential zoning districts are 22,000 square feet, 2,500 square feet, and 12,500 square feet respectively when served by City water and public sewer. The minimum lot size is greater when served only by a septic system.

Currently, sewer does not serve the majority of Reach 2 and there are no plans in place to provide sewer in the immediate future to this portion of the City. Given the existing development pattern, the minimum lot sizes required by the zoning code and the lack of planned sewer expansion in the immediate future, it not expected that the intensity or type of land use would change.

Under the SMP, in Chapter 5: Use Specific Regulations, residential development is permitted in the High Intensity, Shoreline Residential, and Urban Conservancy designations. Residential development in the High Intensity shoreline environment would require an 80-foot standard Shoreline Setback from the OHWM that may be

reduced by 25% with buffer averaging. Residential development in the Shoreline Residential and Urban Conservancy shoreline environments would require a 100-foot standard Shoreline Setback from the OHWM that may be reduced up to 25%.

3. Commercial, Industrial, and Utility Development

Commercial development could occur in the Commercial Use zoning district (0.5% of Reach 2) with a maximum impervious surface coverage of 85% for structures and other impervious surfaces combined. Commercial development is permitted in the High Intensity shoreline environment. Industrial development is not permitted within the zoning districts or shoreline environments of the Reach 2.

Given that the areas zoned for commercial development within the shoreline jurisdiction are developed and they constitute a very small part of Reach 2, it is not anticipated that the intensity or type of land use will change. However, minor levels of development or redevelopment of existing properties could result in impacts on water quality related to impervious surface expansion and stormwater management.

Under the SMP, in Chapter 5: Use Specific Regulations, commercial development in the High Intensity designation would not require a setback for water-dependent structures. A 30-foot standard Shoreline Setback from the OHWM for water-related and water-enjoyment mixed-use structures and an 80-foot standard Shoreline Setback for non-water-oriented structures are required. Shoreline setbacks may be reduced by up to 25% if certain conditions are met and the Shoreline Administrator gives approval.

Primary or accessory utility development could develop in the Public Capital Facilities zoning district (5.6% of Reach 2). Primary utility development is permitted as a conditional use and accessory utility development is permitted outright in the High Intensity, Shoreline Residential, and Urban Conservancy environments. The area zoned Public Capital Facilities is developed in part of services areas for the City's wastewater treatment facility. The use and intensity will not change uses in the near future.

Primary and accessory utility development does not require a shoreline setback for water-dependent structures. A 30-foot standard Shoreline Setback from the OHWM in High Intensity, Shoreline Residential, and Urban Conservancy shoreline environments are required. Non-water-oriented utility structures require an 80-foot Shoreline Setback from the OHWM in the High Intensity shoreline environment and a 100-foot Shoreline Setback from the OHWM in the Shoreline Residential and Urban Conservancy environments.

4. Recreational Development

Public recreational facilities are allowed in the Public Parks and Recreation and Public Capital Facilities zoning designations, which comprise 44.7% and 5.6% of Reach 2 respectively. The West Richland Golf Course is located in the Public Parks and Recreation zoned land, and given the presence of floodway and other development restrictions, it is not expected that this shoreline area will change much from what currently exists. The Public Capital Facilities zoned land is the site of the City's wastewater treatment facility, which will continue to operate for years to come.

Under the SMP, in Chapter 5: Use Specific Regulations, recreational development would be permitted in the High Intensity, Shoreline Residential, and Urban Conservancy environments.

5. Agricultural Uses

The remaining large, relatively undeveloped areas of Reach 2 are zoned for agricultural use. Land zoned for agriculture comprises 47.4% of Reach 2. These parcels will require changes to adopted zoning in order to experience significant changes in intensity or uses allowed. Even with potential zoning changes, the FEMA floodway and associated floodplain restricts development potential.

6. Overwater Structures

Based on SMP Chapter 5: Use Specific Regulations, overwater structures such as boat launches and docks are allowed as a conditional use in the High Intensity, Shoreline Residential, and Urban Conservancy shoreline environments. The City has formal plans to develop water access and a dock near the north side of the Van Giesen Bridge.

7. Shoreline Stabilization

According to aerial photos and site visits, there is diking along Reach 2 within the City. In the High Intensity, Shoreline Residential, and Urban Conservancy environment designations, based on SMP Chapter 4: General Regulations, Table 1 – Shoreline Modification, clearing and grading are permitted if zoning allows, while dredging, fill, shoreline stabilization, and flood hazard reduction measures are permitted as conditional uses subject to review procedures.

Chapter 5: State, Local and Federal Regulations

A. City of West Richland Shoreline Master Program

As discussed in Chapter 4, the CIA has been put together after consideration of reasonably foreseeable development and how this development could impact the functions and processes that are potentially at risk that were discussed in Chapter 3. In addition to the specific details provided in these previous sections, this section provides a brief overview of the entire SMP and how it generally addresses the protection of ecological functions and processes from cumulative impacts. This section is intended to put the SMP regulations in context of the other regulations that apply to this area.

The first level of protection provided by the SMP is the recognition of four different shoreline environment designation types in the City: High Intensity, Shoreline Residential, Urban Conservancy, and Aquatic. These environment designations were assigned based primarily on existing and proposed land uses, which implicitly encompasses differing levels of ecological functions and different probabilities and potentials for improvements of ecological functions, as well as the location of critical areas and their buffers. Each environment designation's designated area is outline below.

- The High Intensity shoreline environment designation is assigned to those areas north of the Van Giesen Bridge currently zoned for Commercial Use and similar higher intensity zones.

- The Shoreline Residential shoreline environment designation includes the area south of the Van Giessen Bridge currently developed with urban single-family development.

- The Urban Conservancy shoreline environment designation is assigned to the Yakima River landward of the OHWM in Reach 1. It is also assigned to the Yakima River landward of the OHWM in portions of Reach 2 characterized by Comprehensive Plan land use designations and supporting zoning districts that anticipate low intensity development, and the presence of critical areas, including flood hazard areas.

- The Aquatic shoreline environment designation is assigned to the Yakima River waterward of the OHWM.

The proposed SMP contains numerous policies, with supporting regulations intended to protect the ecological functions of the shoreline and maintain, at a minimum, the current level of function. Major sections of the proposed SMP are referenced and summarized in Table 1 below and in more detail in the Cumulative Impact Analysis tables in Appendix A.

Table 1 – Summary of Shoreline Master Program Policies and Regulations

SMP Chapter with SMP Goal, Policy, or Regulation	Purpose of SMP Provision	Key General Ecological Functions Protected
Chapter 3: *Environment Designations*	Defines and maps the shoreline jurisdiction in the City and defines and maps the environment designations of all the shorelines of the state in the City. This chapter details policies and regulations specific to the four designated shoreline environment designations (High Intensity, Shoreline Residential, Urban Conservancy, and Aquatic). Specifically, the environments are the key to providing appropriate and specific regulations to ensure no net loss in both developed and undeveloped areas with high functions.	All, with focus on preserving and enhancing shoreline ecological functions.
Chapter 4: *General Regulations*	Sets forth the general policies and regulations applicable to uses, developments, and activities in the City's shoreline jurisdiction. Specifically, it contains the requirement that all development and uses meet no net loss, and provides specific standards for areas such Archaeological and Historic Resources, Critical Areas, Environmental Impacts, Flood Hazard Reduction, Public Access, Restoration, Shoreline Modifications (Clearing and Grading, Dredging, Fill, Shoreline Stabilization, and Flood Hazard Reduction), Shorelines of State-Wide Significance, Vegetation Conservation (Clearing and Grading), and Water Quality.	All, with focus on no net loss, critical areas, vegetation and water quality and quantity.
Chapter 5: *Use Specific Policies and Regulations*	Sets forth policies and regulations governing specific categories of uses and activities typically found in shoreline areas. The policies and regulations cover the following uses and activities:	All, with specific focus on the unique aspects of specific uses that

SMP Chapter with SMP Goal, Policy, or Regulation	Purpose of SMP Provision	Key General Ecological Functions Protected
	Agriculture, Aquaculture, Boating Facilities – Boat Launches and Docks, Civic, Commercial, Forest Practices, Industry, In-Stream Structures, Mining, Parking, Recreational Development, Residential Development, Signs, Transportation Facilities, and Utilities. Specifically, it contains the requirement that all specific shoreline uses meet no net loss.	require specific and unique requirements to assure no net loss.

B. Beneficial Effects of Other Established Regulatory Programs

1. Other Laws and Programs

Besides the SMP, a number of established local, state, and federal laws and regulatory programs provide beneficial effects on shorelines. City regulations and programs include its CAO, Comprehensive Plan, and Stormwater Regulations. State and federal regulations and programs include the Growth Management Act (GMA), SEPA, Regulatory Reform (ESHB 1724), Clean Water Act, Public Trust Doctrine, and Aquatic Lands. In addition, numerous regional programs provide benefits to the City's shoreline.

Through its planning goals, the GMA encourages economic development that is consistent with the adopted City Comprehensive Plan and that is within the capacities of the State's natural resources. In addition, the GMA requires local governments to maintain and enhance natural-resource-based industries, including anadromous fisheries and agricultural industries. Policies that give preference to development that is dependent on the economic resources of the shoreline, including anadromous fisheries and aquaculture, would be consistent with these GMA goals. Discouraging intense economic development in critical salmon spawning areas would be consistent with other GMA goals for protecting fish and wildlife habitat, and protecting the environment. Encouraging water-enjoyment uses in appropriate locations would further GMA's directive to increase access to natural resource lands and water.

The City's Comprehensive Plan directs the general development of the City and the West Richland Municipal Code (WRMC) guides the character and quality of

development relative to shoreline features, especially through critical areas regulations, landscaping regulations, and development regulations.

2. Washington Department of Fish and Wildlife

The Washington Department of Fish and Wildlife (WDFW) has jurisdiction of in- and over-water activities up to and including the OHWM, as well as any other activities that could "use, divert, obstruct, or change the bed or flow of state waters." These activities in the City include, but are not limited to, installation or modification of shoreline stabilization measures and accessory structures such as culverts, and bridges and footbridges. These types of projects must obtain a Hydraulic Project Approval (HPA) from WDFW, which will contain conditions intended to prevent damage to fish and other aquatic life, and their habitats. In some cases, the project may be denied if significant impacts would occur that could not be adequately mitigated.

3. Washington Department of Ecology

The Washington Department of Ecology (Ecology) may review and condition a variety of project types in the City, including any project that requires a shoreline substantial development permit, a shoreline conditional use permit or a shoreline variance, and any project that disturbs more than one acre of land. Project types that may trigger Ecology's involvement include shoreline modification proposals and wetland or stream modification proposals, among others. Ecology's three primary goals are to: 1) prevent pollution, 2) clean up pollution, and 3) support sustainable communities and natural resources. Their authority comes from the SMA, Section 401 of the Federal Clean Water Act, the Federal Water Pollution Control Act, SEPA, the GMA, and various RCWs and WACs of the State of Washington.

4. U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (Corps) has jurisdiction of in- and over-water activities up to and including the OHWM, as well as any associated wetlands. These activities in the City include, but are not limited to, installation or modification of shoreline stabilization measures and accessory structures such as culverts, and bridges, footbridges and restoration activities.

These types of projects must obtain a Section 404 Clean Water Act permit, which will contain conditions intended to prevent damage to Waters of the United States including the Yakima River. In some cases, the project may be denied if significant

impacts would occur that could not be adequately mitigated. As a federal agency, any activity within Corps jurisdiction that could affect species listed under the Federal ESA must be consulted with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service. These agencies ensure that the project includes impact minimization and compensation measures for protection of listed species and their habitats.

5. Regional Programs

In addition to regulatory requirements, regional restoration and water quality improvement plans will contribute to the overall no net loss of ecological functions in the City's shoreline jurisdiction. These include the *Yakima Subbasin Salmon Recovery Plan* (Conley et al. 2009), Ecology's total maximum daily load (TMDL) requirements for suspended sediment and the organochlorine compound dichlorodiphenyltrichloroethane (DDT) (Ecology 1998, 2012; Johnson et al. 2010), the *Integrated Water Resource Management Plan* (USDI 2012), and the *Yakima River Basin* Study (YRBWEP 2011). These plans and their benefits are further described in the *Shoreline Restoration Plan* (Herrera 2013).

Chapter 6: Net Effect on Ecological Functions and Processes

As described in the previous chapters, the proposed SMP provides a substantially increased level of protection to shoreline ecological functions relative to the existing SMP. On its own, the proposed SMP is expected to protect shorelines within the City, resulting in no net loss of shoreline ecological function. In addition, the application of the SMP may improve ecological functions over time along the Yakima River through restoration efforts and significant enhancement incentives in targeted areas, such as in the Urban Conservancy environment designation. State and federal regulations, acting in concert with this SMP, will provide further assurances of improved shoreline ecological functions over time. Together with the implementation of the *Shoreline Restoration Plan*, the SMP is expected to begin to address the enhancement and restoration of shoreline functions in those areas where they are currently impaired.

A. Effects of SMP Provisions

Despite a relatively limited potential or likelihood for significant development to occur in the near future, it is an overall goal of the SMP and SMP update process to ensure no net loss, as well as the long-term enhancement, of unique shoreline features, natural resources, and fish and wildlife habitat. It is also a specific objective to provide for no net loss of shoreline ecological function. The SIC (Herrera and AHBL 2013) identified four ecologic function categories including hydrologic, vegetation, hyporheic, and habitat. Table 6 and Table 7 provide a summary of potential cumulative impacts to shoreline ecological function categories that are associated with reasonably foreseeable future development, and the elements that are included in the SMP which act as countermeasures toward ensuring no net loss of ecological function. Table 8 provides a summary of the SMP provisions, goals, policies, and regulations that support no net loss of ecological functions in the City's shoreline jurisdiction. It also summarizes the effects of cumulative impacts on shoreline functions.

B. Net Effect

As describe above, the proposed SMP provides a substantial level of protection for shoreline ecological functions through strategies such as development setbacks and mitigation requirements where impacts are not otherwise avoided, resulting in no net loss of ecological function. Additional protection and potential for enhancement of ecological functions is provided through consistency with the *Shoreline Restoration Plan* and other federal, state, and

local laws and policies. Together, with implementation of the *Shoreline Restoration Plan*, the proposed SMP has high potential for improving ecological functions in areas of the shoreline jurisdiction where they are currently impaired. Therefore, the cumulative impacts of development in the shoreline jurisdiction are expected to result in no net loss of shoreline ecological functions.

C. Unanticipated Cumulative Impacts

In accordance with (WAC 173-26-201(3)(d)(iii)), the SMP has been developed to avoid or mitigate unanticipated or uncommon impacts that cannot be reasonably identified at this time. Impact avoidance and mitigation will occur during the City's permit review process for future development in the shoreline jurisdiction. Conditional use permits will be required for development proposals or shoreline uses that are not classified or set forth in the SMP.

Mitigation sequencing will be applied during permit review to avoid new incremental impacts to shoreline ecological functions. To ensure mitigation sequencing is applied, the City's CAO, which regulates wetlands, streams, fish and wildlife habitat areas, and other critical areas, was modified to reflect the requirements of the SMA and included as Appendix 3 in the SMP.

Additionally, minimum criteria for review and approval of conditional use permits have been incorporated into the SMP administration provisions pursuant to WAC 173-27-210 and WAC 173-27-160. The criteria include the provision that "the proposed use will cause no unreasonably adverse effects to the City's shoreline jurisdiction, will not result in a net loss of ecological functions, and will not be incompatible with the environment designation or zoning classification in which it is to be located." Additionally, it includes the criteria that "consideration of cumulative impacts resultant from the proposed use has occurred and has demonstrated that no substantial cumulative impacts are anticipated, consistent with WAC 173-27-160(2)."

D. Conclusion

The reasonable foreseeable future development and associated impacts on shoreline ecological functions, in conjunction with the City's SMP provisions, goals, policies, and regulations; *Shoreline Restoration Plan*; and other existing laws, policies, and regulations beyond the SMP were reviewed and compared for this CIA. Together, they provide the basis for evaluating the net effect of both anticipated and unanticipated cumulative impacts of development on shoreline functions. Based on this CIA, the proposed SMP includes policies and regulations that will achieve no net loss of ecological functions as the SMP is implemented over time.

Appendix 1: Cumulative Impact Analysis Tables

Table 2 – Cumulative Impacts to the Shoreline Environment – Nutrient/Pollutant Delivery and Removal

Function: Water Quality
Resources at Risk: The Yakima River and its floodplains, riparian corridors and potential, undelineated wetlands

Shoreline Alterations Impacting Processes and Functions	**Proposed Restoration/ Protection Measures and Draft SMP Policies and Regulations**	**Non-Regulatory Measures**
Current Condition: Existing impervious surfaces increase delivery of nutrients to the Yakima River. Ditching, draining, and filling of wetlands and clearing of riparian has occurred previously within the City. Degree of future cumulative impact: New development may result in additional impervious surfaces and may result in further impacts to existing aquatic resources at risk including associated wetlands. Potential development of residential lots adjacent to the shoreline is small, so future impacts should be low. Nutrient/pollutant processes and water quality functions within the City's shoreline may be impacted by existing roadways, septic systems, and potential expansions.	Proposed Overall Measures: Protect existing Yakima River resources and associated wetlands (including buffers) (SMP Appendix 3.B.3 and Appendix 3.D-Q), and restore riparian areas (SMP Chapter 4.B.10.b.5 and SMP Appendix 3.T). If there is a conflict between the provisions of SMP and CAO, the provisions most protective of the shoreline jurisdiction shall apply, as determined by the City (SMP Chapter 4.B.3.c.1). Appendix 3 of the SMP regulates critical areas such as critical aquifer recharge areas within the shoreline jurisdiction. All shoreline uses and activities shall utilize best management practices (BMPs) to minimize any increase in surface runoff and to control, treat and release surface water runoff so that receiving water quality is not adversely affected during both construction and operation (SMP Chapter 1.G.1, Chapter 4.B.10.b.3, and Chapter 4.B.10.c.5). The SMP specifically addresses water quality in Chapter 4: General Regulations, policies and regulations for Water Quality, Section 11. The City's Comprehensive Plan addresses cooperation with the Benton County Health District to ensure pollutants from septic systems do not enter groundwater.	Restore degraded wetlands. Restore degraded riparian areas through replanting with native species. The *Shoreline Restoration Plan* outlines the non-regulatory measures that will be available to the City to help address these issues.

Table 3 – Cumulative Impacts to the Shoreline Environment – Surface and Groundwater Flow

Function: Reducing downstream flooding and erosion (surface storage), aquifer recharge and storage
Resources at Risk: The Yakima River and its floodplains, riparian corridors and potential, undelineated wetlands

Shoreline Alterations Impacting Processes and Functions	**Proposed Restoration/ Protection Measures and Draft SMP Policies and Regulations**	**Non-Regulatory Measures**
Current Condition: Impervious areas and clearing decrease infiltration recharge, subsurface storage, and groundwater discharge to rivers and wetlands. Wetland fill, development in floodplain (including shoreline protective structures) reduces surface storage, overbank flooding and increased flooding frequency and duration. Degree of future cumulative impact: New development will remove scrubland areas and increase impervious cover. Additional impacts to surface storage functions may occur from shoreline fill and encroachment. Potential development of residential lots adjacent to the shoreline is small, so future impacts should be low. Residential development is allowed in the High Intensity, Shoreline Residential, and Urban Conservancy shoreline areas adjacent to the Yakima River.	Proposed Overall Measures: Minimize impacts to surface and groundwater processes by employing nonstructural approach to reducing downstream flooding and erosion. This would include protecting and restoring wetlands Reference found in SMP Chapter 2.I and Chapter 4.B.5.b. If there is a conflict between the provisions of SMP and CAO, the provisions most protective of the shoreline jurisdiction shall apply, as determined by the City (SMP Chapter 4.B.3.c.1). Chapter 18.16 – Flood Damage Prevention of the WRMC regulates frequently flooded areas. The SMP specifically addresses flood hazard reduction in Chapter 4: General Regulations, policies and regulations for Flood Hazard Reduction, Section B.5.	Restore degraded wetlands. Restore degraded floodplain and riparian areas through replanting with native species. The *Shoreline Restoration Plan* outlines the non-regulatory measures that will be available to the City to help address these issues.

Table 4 – Cumulative Impacts to the Shoreline Environment – Sediment Transport

Function: Sediment delivery and removal from area water systems
Resources at Risk: The Yakima River and its floodplains, riparian corridors and potential, undelineated wetlands

Shoreline Alterations Impacting Processes and Functions	**Proposed Restoration/ Protection Measures and Draft SMP Policies and Regulations**	**Non-Regulatory Measures**
Current Condition: Sediment delivery and removal processes have been affected by both natural and man-made factors. Development in the watershed has altered the process of sediment transport. Converting scrubland vegetation to agricultural land, constructing roads, and development has altered or accelerated sediment transport processes within the basin. Future Cumulative Impact: Potential for further sediment delivery into water systems without protective vegetation due to land clearing and development upstream of the City. Development may affect storage of surface waters in wetlands and floodplains in this basin, which in turn could affect flooding, and erosion functions within downstream shoreline areas along the Yakima River.	Proposed Overall Measures: Minimize the delivery of sediment from land alterations through retention of natural vegetation, protection of riparian corridors, application of a comprehensive erosion and sedimentation control program and measures and proper siting of development. References found in SMP Chapter 4.B.10.b.2, and .4, and .5, SMP Chapter 4.B.10.c.2.5, SMP Chapter 4.B.8.e.3.a.8.h, SMP Chapter 5.D.13.b.3, and .5, and SMP Appendix 3.CC. SMP Appendix 3.CC, and .DD, and .EE regulate geologically hazardous areas in the shoreline jurisdiction. The SMP specifically addresses water quality in Chapter 4: General Regulations, Section 4.B.11 Water Quality. Under Section 10 Vegetation Conservation in Chapter 4: General Regulations, land clearing, grading, and filling must be limited to the minimum necessary for development.	Create incentive programs to conserve and retain native vegetation and restore native vegetation where none is present. Programs such as on-site density transfers and conservation easements could help protect these areas. The *Shoreline Restoration Plan* outlines the non-regulatory measures that will be available to the City to help address these issues.

Table 5 – Cumulative Impacts to the Shoreline Environment – Habitat Biodiversity

Function: Fish and wildlife habitat, food production and delivery
Resources at Risk: The Yakima River and its floodplains, riparian corridors and potential, undelineated wetlands

Shoreline Alterations Impacting Processes and Functions	**Proposed Restoration/ Protection Measures and Draft SMP Policies and Regulations**	**Non-Regulatory Measures**
Current Condition: Important in-stream and riparian habitat is present in the Yakima River system. Habitat elements important to fish include riparian cover, passage for migration, clean water, and spawning habitat and forage habitat, and the availability of food sources. Habitat functions are altered with development, road construction, culvert installation, loss of riparian cover, and stream and riverbank modification. Alteration of scrubland habitat, loss of wetlands, streams, and rivers reduce the overall habitat for wildlife species, including mammals, amphibians, reptiles, waterfowl, birds and other wildlife species. Habitat Connectivity is diminished as riparian cover is removed and culverts, bridges, bulkheads, riprap, filling, and dredging interrupt aquatic systems. Loss of habitat features such as banks with	Proposed Overall Measures: Protect and restore riparian habitat, aquatic habitat, and wetlands (SMP Chapter 2.G.1, SMP Chapter 4.B.9.b.2 and .4, SMP Chapter 4.B.10.c.12, and SMP Appendix 3.V). If there is a conflict between the provisions of SMP and shoreline jurisdiction CAO in SMP Appendix 3, the provisions most protective of the shoreline jurisdiction shall apply, as determined by the City (SMP Chapter 4.B.3.c.1). SMP Appendix 3.V regulates critical fish and wildlife conservation areas within the shoreline jurisdiction. The SMP specifically addresses water quality in Chapter 4: General Regulations, Section 4.B.11 Water Quality. The SMP specifically addresses protection and restoration of native vegetation within the shoreline jurisdiction. See SMP Chapter 4.D.10. The purpose is to conserve vegetation in the shoreline jurisdiction, restrict clearing and grading to the	Restore degraded wetlands and aquatic system. This includes restoring degraded riparian and aquatic habitat by planting with native species and addition of habitat features. The *Shoreline Restoration Plan* will outline the non-regulatory measures that will be available to the City to help address these issues.

Shoreline Alterations Impacting Processes and Functions	Proposed Restoration/ Protection Measures and Draft SMP Policies and Regulations	Non-Regulatory Measures
scrubland vegetation decreases wildlife cover, denning, perching, and nesting habitat. <u>Future cumulative impacts:</u> Potential development of residential lots adjacent to the shoreline is small. Lots are large and future development will likely occur outside of the shoreline jurisdiction. Land use is either operating agricultural land in Reach 1, developed in Reach 2, or constrained by floodway in Reach 2. Future impacts should be low if provisions of the SMP are followed. Any future development may affect habitat and water quality functions within the City's shoreline.	minimum amount necessary, and control invasive weeds and non-native species. Section 9, Shorelines of Statewide Significance in Chapter 4: General Regulations, Policies 2 through 4 call for the City to protect and restore diversity of vegetation and habitat associated with shoreline areas. Under Section 9, Shorelines of Statewide Significance in Chapter 4: General Regulations, Policy 4 calls for all shoreline development to be located, designed, constructed, and managed to avoid disturbance of and minimize adverse impacts to wildlife resources, including spawning, nesting, rearing and habitat areas and migratory routes.	

Table 6 – Shoreline Function Impacts Associated with Residential or Commercial Development or Agriculture and SMP Counter Measures

Function Category	Potential Cumulative Impacts to Shoreline Functions	SMP Countermeasures
Hydrologic	• Altered flows and water quality associated with increased impervious surface.	• Environment designations concentrate development in least sensitive areas. • Limits parking facilities. • Prohibits industry, forestry, and mining.
Vegetation	• Reduced water quality from increase in pesticide and fertilizer. • Increased risk of bank instability, increased erosion, and increased turbidity associated with vegetation clearing.	• Provides for minimum building and agriculture activity setbacks. • Requires increased setbacks if necessary to protect functions. • Mitigation standards for vegetation clearing. • Requires best management practices (BMPs) and compliance with City's stormwater management program for clearing and grading. • Provision for vegetation conservation.
Hyporheic	• Increased need for bank stabilization or protection structures could result in direct disturbance and alteration of the hyporheic zone, reducing the potential for water or sediments storage, and removal of nutrients or toxins, altered water temperatures, or other water quality conditions. • Altered surface water and groundwater exchange due to agricultural practices.	• Prohibits high impact utilities and agriculture facilities, manure lagoons, confinement lots, and feeding operations. • Requires building setbacks. • Limits shoreline stabilization and encourages non-structural treatments. • Prohibits the creation of new agricultural lands by diking, draining, or filling wetlands.
Habitat	• Reduced habitat area or suitability for specific species. • Reduced habitat complexity and habitat connectivity.	• Limits non-water oriented uses. • Provides standards for restoration activities and consistency with the *Shoreline Restoration Plan*.

Table 7 – Shoreline Function Impacts Associated with In-water and Overwater Structures or Shoreline Modifications and SMP Counter Measures

Function Category	Potential Cumulative Impacts to Shoreline Functions	SMP Countermeasures
Hydrologic	• Altered hydraulics that affects habitat conditions or reduce potential for habitat formation. • Altered movement of sediments.	• Limitations and standards for shoreline modifications including dredging, fill, shoreline stabilization.
Vegetation	• Reduced riparian vegetation resulting in increased erosion, bank instability, and altered habitat.	• Requires BMPs and compliance with City's stormwater management program for clearing and grading. Provision for vegetation conservation.
Hyporheic	• Water quality impacts resulting from structures interfering with hyporheic flows.	• Limits shoreline stabilization and encourages non-structural treatments. • Restricts gravel removal for flood management.
Habitat	• Altered substrate composition due to hydrologic impacts. • Reduced habitat complexity and connectivity between terrestrial and aquatic environments. • Increased shading or substrate alteration affecting plant growth, benthic community, and behavior of aquatic organisms. • Altered ecological interactions.	• Provides provisions for boating facility design, including location, size, number, and operation standards. • Limitations on aquaculture facilities. • Provisions for in-stream habitat enhancement, vegetation conservation, and mitigation standards.

Table 8 – Summary of Shoreline Master Program and Effects of Cumulative Impacts on Shoreline Functions

SMP Chapter containing goals, policies, or regulations, to protect ecological functions	Purpose of SMP Provision, Goals, Policy or Regulation	Summary of Cumulative Impacts Effects on Key Shoreline Functions [1]
Chapter 2: Master Program Elements	• Establishes a framework upon which the more detailed SMP shoreline use environments, policies, regulations, and administrative procedures are based. • Specifically, includes a conservation element to preserve natural resources and provide for no net loss of ecological function.	• Serves to protect all functions potentially affected by the SMP, future development, and shoreline restoration or enhancement activities.
Chapter 3: Shoreline Environments	• Defines and maps the shoreline jurisdiction and environment designations of all the shorelines in the City. Policies and regulations specific to the four designated shoreline environments (High Intensity, Shoreline Residential, Urban Conservancy, and Aquatic) are detailed in this chapter. • The shoreline environments are the key to providing specific management policies and regulations to ensure no net loss in both developed and undeveloped areas with high functions.	• Protects all functions, with focus on preserving and enhancing existing shoreline ecological functions.
Chapter 4: General Regulations	• Sets forth the general policies and regulations that apply to uses, developments, and activities in all shoreline areas of the City. • Specifically, it contains the requirement that all development and uses meet no net loss, and include measures to mitigate environmental impacts. • Provides specific standards for critical areas, environmental impacts, flood hazard reduction, restoration, shoreline modifications, vegetation conservation, and water quality to achieve no net loss. • Requires periodic review of shoreline conditions to determine whether other actions are necessary to ensure no net loss.	• Protects all functions with focus on critical areas, riparian vegetation, and water quality and quantity. • Provides standards for environmental impacts review and mitigation

SMP Chapter containing goals, policies, or regulations, to protect ecological functions	Purpose of SMP Provision, Goals, Policy or Regulation	Summary of Cumulative Impacts Effects on Key Shoreline Functions [1]
Chapter 5: Use Specific Regulations	• Sets forth policies and regulations governing specific categories of uses and activities typically found in shoreline areas. • For example, establishes minimum shoreline setbacks, prohibits industry and mining, and limits in-stream structures to fish habitat enhancements.	• Protects all functions, with specific focus on the unique aspects of uses that require specific and unique requirements to assure no net loss.

[1] Key functions for the shoreline jurisdiction and specific reaches are described in the SIC (Herrera and AHBL 2013).

Appendix 2: References

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